

CLAIMS

1. Electronic voting system for collecting and counting votes from individual voters using electronic polling equipment in an election comprising a list of subjects to be elected, from which list one subject
5 is to be elected by an individual voter, said votes being forwarded by means of a data network, said voting system comprising:
- means for generating a unique personal key for each individual voter entitled to said election, which unique personal key is to be communicated to said individual voter;
 - 10 - means for generating a unique subject code for each subject on said list of subjects to be elected in said election;
 - means for generating a reference election record for each individual voter comprising all potential virtual ballot forms for said individual voter, wherein a unique voter identity code for said
15 individual voter is calculated from a unique code for said election and the unique personal key of said voter, wherein a unique subject identity code for each subject on said list of subjects to be elected by said voter in said election is calculated from said unique subject codes and said unique personal key of said voter, and wherein said calculated
20 identity codes form part of the virtual ballot forms;
 - means for storing said reference election records for said individual voters;
 - means for loading a tool in said polling equipment of said individual voter wherein said tool comprises means for calculating
25 the unique voter identity code of said voter from said election code and the unique personal key communicated to said voter, for calculating the unique subject identity code of the subject elected by said voter from the unique subject code of said subject elected by said voter and said unique personal key of said voter and for generating the virtual ballot
30 form comprising said calculated identity codes by using said polling equipment;

- means for forwarding said virtual ballot form by said polling equipment over said data network;

- means for receiving and collecting said virtual ballot form forwarded by said polling equipment;

5 - means for verifying each collected virtual ballot form with respect to its presence in said reference election records of said voters;

- means for counting votes, and

- means for establishing an election result,

10 characterized by means for validating votes from said collected virtual ballot forms, which validating means are arranged in such way that if a set of two or more virtual ballot forms associated with an identical voter identity code is collected, one virtual ballot form of said set is validated as one valid vote of said voter and the remaining virtual
15 ballot forms of said set are marked as duplicate, provided said virtual ballot forms of said set are identical as to the subject elected by said voter, otherwise all virtual ballot forms of said set are marked invalid.

2. Electronic voting system for collecting and counting votes from individual voters using electronic polling equipment in an election
20 comprising a list of subjects to be elected, from which list one combination of subjects is to be elected by an individual voter, said votes being forwarded by means of a data network, said system comprising:

- means for generating a unique personal key for each individual voter entitled to said election, which unique personal key is
25 to be communicated to said individual voter;

- means for generating a unique subject combination code for each combination of subjects on said list of subjects to be elected in said election;

- means for generating a reference election record for each
30 individual voter comprising all potential virtual ballot forms for said individual voter, wherein a unique voter identity code for said

individual voter is calculated from a unique code for said election and the unique personal key of said voter, wherein a unique subject combination identity code for each combination of subjects on said list of subjects to be elected by said voter in said election is calculated from the unique subject combination code for said combination of subjects and said unique personal key of said voter, and said calculated identity codes and wherein said calculated identity codes form part of the virtual ballot forms for said individual voter;

- means for storing said reference election records for said individual voters;

- means for loading a tool in said polling equipment of said individual voter wherein said tool comprises means for calculating the unique voter identity code for said voter from said election code and the unique personal key of said voter, means for calculating the unique subject combination identity code for the combination of subjects elected by said voter from the unique subject combination code for said combination of subjects elected by said voter and the unique personal key of said voter, and means for generating the virtual ballot form comprising said calculated identity codes by using said polling equipment;

- means for forwarding said virtual ballot form by said polling equipment over said data network;

- means for receiving and collecting said virtual ballot form forwarded by said polling equipment;

- means for verifying each collected virtual ballot form with respect to its presence in said reference election records of said voters;

- means for counting votes, and

- means for establishing an election result,

characterized by means for validating votes from said collected virtual ballot forms, which validating means are arranged in such way that if a

set of two or more virtual ballot forms associated with an identical voter identity code is collected, one virtual ballot form of said set is validated as one vote of said voter and the remaining virtual ballot forms of said set are marked as duplicate, provided said virtual ballot forms of said set are identical as to said one combination of subjects elected by said voter, otherwise all virtual ballot forms of said set are marked invalid.

3. Electronic voting system according to claim 1 or 2, wherein said validating means form part of said means for verifying said collected virtual ballot forms.

4. Electronic voting system according to claim 1 or 2, wherein said validating means form part of said means for counting said votes.

5. Electronic voting system according to any of the previous claims, further comprising confirmation means for generating a receipt indicating that a virtual ballot form has been received from said polling equipment of said voter and means for delivering said receipt comprising a unique receipt confirmation value in readable form at said polling equipment of said voter.

6. Electronic voting system according to any of the previous claims, further comprising means for publishing the list of voters entitled to said election, the list of subjects to be elected in said election and said reference election records for said individual voters, enabling public inspection before the date of said election, and entry means for each individual voter using said unique personal key for inspection of the reference election record for said individual voter.

7. Electronic voting system according to any of the previous claims, further comprising means for publishing the election-result comprising the record of the valid votes as awarded for said collected virtual ballot forms after been submitted for verification and validation, enabling public inspection, and entry means for each individual voter using said unique personal key for inspection of the

account of said virtual ballot form forwarded by said polling equipment of said individual voter.

8. Electronic voting system according to any of the previous claims, further comprising means for generating and storing a reference
5 service identity code for each individual voter entitled to said election, which reference service identity code is calculated from a fixed part of said unique personal key of said voter and information related to said election and means for keeping a status record of said voter at said means for receiving and collecting said virtual ballot
10 forms, wherein said status record is associated with said reference service identity code of said voter.

9. Electronic voting system according to claim 8, wherein said tool to be loaded in said polling equipment of said voter is arranged for calculating a service identity code from said fixed part of said unique
15 personal key of said voter and said information related to said election and for forwarding said service identity code to said means for receiving and collecting said virtual ballot forms.

10. Electronic voting system according to any of the previous claims, further comprising communication means for communicating said
20 unique personal key to each individual voter entitled to said election, said communication means comprises at least one of a group including means for electronically storing said unique personal key in a chip card of said voter, data communication means for communicating said unique personal key to said voter by a data network such as the Internet or a
25 fixed and/or mobile data communication network including a Short Message Service, and means for providing said unique personal key in a human and/or machine readable form on a hard copy, such as a text message on paper, for communicating by mail to said voter.

11. Electronic voting system according to claim 10, wherein
30 said polling equipment is arranged for operatively connecting same to data input means comprising at least one of a group including a chip card

reader, a keyboard, a mouse, a screen, a bar code reader and voice conversion means.

12. Electronic voting system according to any of the previous claims, wherein said means for receiving and collecting virtual ballot forms are arranged for receiving and collecting virtual ballot forms other than forwarded by polling equipment of a voter, such as physical ballot forms received by mail and converted into virtual ballot forms by automatic ballot form reading and conversion means.

13. Electronic voting system according to claim 12, wherein said means for verification and validating are arranged in such way that if a set of two or more virtual ballot forms associated with an identical voter identity code is collected and said virtual ballot forms are collected from means of different kinds that have been appointed differing values of priority only the virtual ballot forms collected from the means of the kind with the higher value of priority are submitted for verification and validation.

14. Electronic voting system according to claim 13 wherein said means for verification and validation are arranged in such way that the means in which physical ballot forms received by mail are converted into virtual ballot forms are appointed the lower value of priority.

15. Electronic voting system according to any of the previous claims dependent on claim 1, wherein said means for generating a unique subject identity code for each subject to be elected in said election, said means for generating a unique voter identity code and said means for generating a reference election record for each individual voter entitled to said election comprise cryptographic generator and calculator means.

16. Electronic voting system according to any of the previous claims dependent on claim 2, wherein said means for generating a unique subject combination identity code for each combination of subjects to be elected in said election, said means for generating a unique voter identity code and said means for generating a reference election record

for each individual voter entitled to said election comprise cryptographic generator and calculator means.

17. Electronic voting system according to claim 15 or 16 wherein said cryptographic generator and calculator means are arranged
5 for symmetric encryption.

18. Electronic voting system according to any of the previous claims, wherein said means for presenting said list of subjects from which one subject or one combination of subjects is to be elected by said voter at said polling equipment, said means for loading said tool in said
10 polling equipment of a voter, said means for receiving and collecting said virtual ballot form forwarded by said polling equipment and said confirmation means are supported by computer equipment comprising at least one computer server.

19. Electronic voting system according to any of the previous
15 claims, wherein the or each of said means for loading said tool in said polling equipment of a voter, said means for receiving and collecting said virtual ballot form forwarded by said polling equipment, said confirmation means and said polling equipment are arranged for providing secure data transmission over said data network.

20. Electronic voting system according to any of the previous
20 claims, wherein said means for generating a unique personal key for each individual voter, said means for generating said unique voter identity code for each individual voter, means for generating for generating said unique identity code for each subject or combination of subjects to be
25 elected in said election, said means for generating said reference election record for each individual voter entitled to said election, said means for verifying the collected virtual ballot form of said individual voter with respect to its presence in said reference election record of said voter, said means for counting votes of said voters, said means for
30 validating votes from said collected virtual ballot forms and said means for establishing an election-result based on said counted votes are

supported by computer equipment arranged to be operated under the supervision of an election authority.

21. Electronic voting system according to any of the previous claims, wherein said polling equipment comprises at least one of a group
5 including a personal computer and fixed and mobile data communication equipment arranged for providing access to said data network.

22. Method for electronic voting, for collecting and counting votes from individual voters using electronic polling equipment in an election comprising a list of subjects to be elected, from which list one
10 subject is to be elected by an individual voter, said votes being forwarded by means of a data network, said method comprising the steps of:

- generating a unique personal key for each individual voter entitled to said election;
- 15 - communicating said unique personal keys to said individual voters;
- generating a unique subject code for each subject on said list of subjects to be elected in said election;
- generating a reference election record for each
20 individual voter comprising all potential virtual ballot forms for said individual voter, wherein a unique voter identity code is calculated for said individual voter from a unique code for said election and the unique personal key of said voter, a unique subject identity code for each subject on said list of subjects to be elected by said voter in said
25 election is calculated from said unique subject codes and said unique personal key of said voter, said calculated identity codes forming part of the virtual ballot forms;
- storing said reference election records for said individual voters;
- 30 - loading a tool in said polling equipment of a voter;
- electing one subject from said list at said polling

equipment of said individual voter, by inputting said unique personal key communicated to said voter and said unique subject code for said one elected subject into said polling equipment;

5 - generating a virtual ballot form using said tool loaded into said polling equipment of said voter, wherein a unique voter identity code is calculated from said election code and said unique personal key of said voter, wherein a unique subject identity code is calculated from said unique subject code for said one subject elected by said voter from said unique subject code of said one subject elected and
10 said unique personal key of said voter and wherein said calculated identity codes form part of said virtual ballot form;

 - forwarding said virtual ballot over said data network;

 - receiving and collecting said virtual ballot form forwarded by said polling equipment;

15 - verifying each collected virtual ballot form with respect to its presence in said reference election records of said voters;

 - counting votes, and

 - establishing an election-result based on said counted votes, characterized by a step for validating votes from said collected
20 virtual ballot forms in such way that, if a set of two or more virtual ballot forms associated with an identical voter identity code is collected, one virtual ballot form of said set is validated as one single valid vote of said voter and the remaining virtual ballot forms of said set are marked as duplicate, provided that said virtual ballot forms of
25 said set are identical as to said one subject elected by said voter, otherwise said virtual ballot forms of said set are marked invalid.

23. Method for electronic voting, for collecting and counting votes from individual voters using electronic polling equipment in an election comprising a list of subjects to be elected, from which list one
30 combination of subjects is to be elected by an individual voter, said votes being forwarded by means of a data network, said method comprises

the steps of:

- generating a unique personal key for each individual voter entitled to said election;

- communicating said unique voter identity code to each individual voter;

- generating a unique subject combination code for each combination of subjects on said list of subjects to be elected in said election;

- generating a reference election record for each individual voter comprising all potential virtual ballot forms for said individual voter wherein a unique voter identity code is calculated from a unique code for said election and said unique personal key of said voter, a unique subject combination identity code for each combination of subjects on said list of subjects to be elected by said voter in said election is calculated from said unique subject combination code and said unique personal key of said voter, said calculated identity codes forming part of said virtual ballot forms;

- storing said reference election records for said individual voters;

- loading a tool in said polling equipment of a voter;
- electing one combination of subjects from said list at said polling equipment of said individual voter, by inputting said unique personal of said voter and said unique subject combination code for said one elected combination of subjects into said polling equipment;

- generating a virtual ballot form on said polling equipment using said tool loaded into said polling equipment of said voter wherein a unique voter identity code is calculated from said election code and said unique personal key of said voter, wherein a unique subject combination identity code is calculated from said subject combination code for said one combination of subjects elected and said unique personal key of said voter and wherein said calculated identity

codes form part of said virtual ballot form;

- forwarding said virtual ballot form over said data network;

- receiving and collecting said virtual ballot form forwarded by said polling equipment;

- verifying each collected virtual ballot form with respect to its presence in said reference election records of said voters;

- counting votes, and

- establishing an election result based on said counted votes, characterized by a step for validating votes from said collected virtual ballot forms in such way that, if a set of two or more virtual ballot forms associated with an identical voter identity code is collected, one virtual ballot form of said set is validated as one valid vote of said voter and the remaining virtual ballot forms of said set are marked duplicate, provided that said virtual ballot forms of said set are identical as to said one combination of subjects elected by said voter, otherwise all virtual ballot forms of said set are marked invalid.

24. Method for electronic voting according to any of the claims 22 - 23, further comprising the step of generating a receipt comprising a unique receipt confirmation value in readable form indicating that a virtual ballot form forwarded over said data network has been received, and wherein said receipt is delivered at said polling equipment of said voter.

25. Method for electronic voting according to any of the claims 22 - 24, further comprising the step of publishing the list of voters entitled to said election, the list of subjects to be elected in said election and said reference election records for said individual voters, enabling public inspection before the date of said election, and the step for providing entry means for each individual voter using said unique personal key for inspection of the reference election record for said individual voter.

26. Method for electronic voting according to any of the claims 22 - 25, further comprising the step of publishing the election result comprising the record of said valid votes as awarded for said collected virtual ballot forms after been submitted for verification and validation, enabling public inspection and the step for providing entry means for each individual voter using said unique personal key for inspection of the record of said vote for said virtual ballot form forwarded by said polling equipment of said individual voter.

27. Method for electronic voting according to any of the claims 22 - 26, further comprising the steps of generating and storing a reference service identity code for each individual voter entitled to said election wherein said reference service identity code is calculated from a fixed part of said unique personal key of said voter and information related to said election, and the step of keeping a status record for each individual voter associated to said reference service identity code.

28. Method for electronic voting according to any of the claims 22 - 27, further comprising the step of generating a service identity at said polling equipment of said voter wherein said service identity code for said voter is calculated from said first part of said unique voter identity code of said voter and information related to said election using said tool been loaded in said polling equipment of said voter, and the step of forwarding said service identity code to said means for receiving and collecting said virtual ballot form.

29. Method for electronic voting according to any of the claims 22 - 24, further comprising the step of receiving and collecting virtual ballot forms other than forwarded by said polling equipment of a voter, such as physical ballot forms forwarded by mail, and converting said physical ballot forms into virtual ballot forms using automatic ballot form reading and conversion means.

30. Method for electronic voting according to claim 29, wherein

the step of validating is arranged in such way that if two or more virtual ballot forms associated with an identical voter identity code are collected and said virtual ballot forms are collected from means of different kinds having been appointed differing values of priority, only
5 the virtual ballot forms collected from the means with the higher value of priority are submitted for validation.

31. Method for electronic voting according to claim 30, wherein the step of validating is arranged in such way that the means in which physical ballot forms received by mail are converted into virtual ballot
10 forms are appointed the lower value of priority.

32. Method for electronic voting according to any of the claims 22 - 31, wherein said unique identity code for each subject or each combination of subjects to be elected, said unique voter identity code and said reference election record for each individual voter entitled to
15 said election are cryptographically generated and calculated.

33. Method for electronic voting according to claim 32, wherein said identity codes and reference election records are generated and calculated for symmetric encryption.

34. Method for electronic voting according to any of the claims
20 22 - 33, wherein said steps of generating said unique personal key for each individual voter entitled to said election, said unique voter identity code for each individual voter, said identity code for each subject or each combination of subjects to be elected, said reference election record for each individual voter entitled to said election, and
25 said steps of verifying the validity of a collected virtual ballot form of an individual voter with respect to its presence in said reference election record of said voter, validating said collected virtual ballot forms, counting votes and establishing said election-result are performed under the supervision of an election authority.

30 35. Method for electronic voting according to any of the claims 22 - 34, wherein said step of communicating said unique personal key to

each individual voter entitled to said election comprises at least one of a group of steps including electronically storing said unique personal key in a chip card of said voter, communicating said unique personal key to said voter by a data network such as the Internet or a fixed and/or
5 mobile data communication network including a Short Message Service, and providing said unique personal key in a human and/or machine readable form on a hard copy, such as a text message on paper, for communicating by mail to said voter.

36. Method for electronic voting according claim 35, wherein
10 said hard copy is suitable to be cast as a physical ballot form comprising said subjects or said combinations of subjects to be elected by said voter.

37. Method for electronic voting according to any of the claims
22 - 36, wherein a reserve-list of a limited number of unique reserve
15 keys is generated and said reference election record is generated to comprise virtual ballot forms for said number of unique reserve keys, and wherein a reserve key of said reserve-list is issued to a voter who applies for a fresh unique key replacing said unique personal key initially appointed to said voter, wherein said reserve key is appointed
20 to said voter after said initially appointed unique personal key and said corresponding reference election record are withdrawn, and wherein said issue of said reserve key from and said withdrawal of said initially appointed unique personal key are taken into account for the verification of the validity of collected virtual ballot forms.

25 38. Method for electronic voting according to any of the claims 22 - 37, wherein said polling equipment comprises at least one of a group including a personal computer and fixed and mobile data communication equipment arranged for providing access to said data network using browser software, and wherein said tool is loaded automatically into said
30 polling equipment from said data network.

39. Method for electronic voting according to claim 38, wherein

said data network comprises the Internet and said polling equipment comprises a personal computer operatively connected to the Internet, wherein said tool is loaded into said personal computer by means of a Java applet included in a web-page to be selected by a voter for participating in said election.

40. Method for electronic voting according to claim 39, wherein said polling equipment comprises GSM communication equipment having a SIM-card and wherein said tool is loaded in said SIM-card of said communication equipment for participating in said election by a voter using said communication equipment.

41. Computer program product, comprising program code means stored on a computer readable medium, for performing the or part of the steps according to any of claims 22 - 40, if loaded into an internal working memory of said computer and operated by said computer.

42. Computer program product, comprising program code means stored on a computer readable medium, arranged as a tool for loading into a computer program running on a computer controlled polling equipment for performing the steps according to any of the claims 22, 28 and 37 - 40 if loaded into an internal working memory of said computer and operated by said computer.